

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	V. S. Shirley	NDS 75,377 (1995)	1-Oct-1993

$Q(\beta^-) = -3.67 \times 10^3$ 4; $S(n) = 9.14 \times 10^3$ 4; $S(p) = 3.28 \times 10^3$ 4; $Q(\alpha) = 3.26 \times 10^3$ 3 [2012Wa38](#)

Note: Current evaluation has used the following Q record $-4.0\text{E}+3$ 39090 SY3390 SY3160 syst [1993Au05](#).

 ^{173}Ta LevelsCross Reference (XREF) Flags

A ^{173}W ε decay
B (HI,xn γ)

E(level) [†]	J $\pi^{\ddagger}$	T _{1/2}	XREF	Comments
0.0 [#]	5/2 ⁻	3.14 h <i>I3</i>	AB	$\% \varepsilon + \% \beta^+ = 100$ $\mu = 1.703$ 34; $Q = -1.9$ 2 μ : radiative detection of NMR (1991Ko25) (includes Knight shift correction). Q: static (low-temperature) nuclear orientation (1983Ed01). J π : 5/2 ⁻ 1/2[541] or 5/2 ⁺ 5/2[404] from intense ε branching to 1/2[521] band. 5/2 ⁻ 1/2[541] confirmed by magnitude of μ and sign of Q, as known for this state in ^{177}Ta , ^{181}Re , ^{185}Ir , ^{185}Au . T _{1/2} : from 1986Sz05 . Other values: 3.65 h 5 (1963Sa14), 3.5 h 3 (1971Na28). Others: 1960Fa03 , 1962Ma41 , 1963Ra14 .
0.0+x [@]	5/2 ⁺ ^d		AB	
83.43 [#] 7	9/2 ⁻		AB	
109.52+x [@]	7/2 ⁺		B	
130.19+x ^{&}	7/2 ⁺ ^d	≤ 5 ns	AB	T _{1/2} : $\gamma\gamma(t)$ in (HI,xn γ).
165.88+x ^a	9/2 ⁻ ^d	225 ns <i>I5</i>	AB	T _{1/2} : $\gamma\gamma(t)$ in (HI,xn γ).
245.86+x [@]	9/2 ⁺		B	
260.37+x ^{&}	(9/2 ⁺)		B	
269.94 [#] <i>I2</i>	13/2 ⁻		B	
305.85+x ^a	11/2 ⁻		B	
324.54 [#] 8	7/2 ⁻		A	
408.27+x [@]	11/2 ⁺		B	
414.50+x ^{&}	(11/2 ⁺)		B	
471.83+x ^a	13/2 ⁻		B	
560.7 [#] 4	17/2 ⁻		B	
590.22+x ^{&}	(13/2 ⁺)		B	
593.40+x [@]	13/2 ⁺		B	
623.54+x ^b	7/2 ⁻		A	J π : 7/2 ⁻ 7/2[523] for 623.54+x level and 5/2 ⁻ 5/2[512] for ^{173}W g.s. from $\log ft \approx 5.1$ (^{173}W to 623.54+x level) and $\log ft \approx 6.1$ (^{173}W to 324.5 level) (1991KuZN).
634 [?] ^c 2	(9/2 ⁻) ^e		B	
661.34+x ^a	15/2 ⁻		B	
785.55+x ^{&}	(15/2 ⁺)		B	
801.28+x [@]	15/2 ⁺		B	
874.2+x ^a	17/2 ⁻		B	
877 [?] ^c 2	(11/2 ⁻) ^e		B	
887.1 [#] 4	(15/2 ⁻)		B	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{173}Ta Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
950.7 [#] 6	21/2 ⁻		B	
997.6+x &	(17/2 ⁺)		B	
1026.2+x @	17/2 ⁺		B	
1105.2+x ^a 3	19/2 ⁻		B	
1224.7+x &	(19/2 ⁺)		B	
1271.0+x @	19/2 ⁺		B	
1294 [#] 2	(19/2 ⁻)		B	
1304 ^c 2	(15/2 ⁻) ^e		B	
1357.9+x ^a	21/2 ⁻		B	
1431.8 [#] 7	25/2 ⁻		B	
1464.8+x &	(21/2 ⁺)		B	
1526.8+x @	21/2 ⁺		B	
1621.9+x ^a	23/2 ⁻		B	
1713.5+x 4	(21/2 ⁻)	≈100 ns	B	J ^π : from timing and coincidence data (1977An04). A three quasiparticle state with J ^π =21/2 ⁻ , as in ^{175}Ta and ^{177}Ta , is predicted to be at 1700 keV. T _{1/2} : γγ(t) in (HI,xnγ).
1716.9+x &	(23/2 ⁺)		B	
1800.9+x @	23/2 ⁺		B	
1824 [#] 2	(23/2 ⁻)		B	
1875 ^c 2	(21/2 ⁻) ^e		B	
1906.0+x ^a	25/2 ⁻		B	
1980.7+x &	(25/2 ⁺)		B	
1995.2 [#] 8	29/2 ⁻		B	
2068.3+x @	25/2 ⁺		B	
2194.1+x ^a	27/2 ⁻		B	
2255.3+x &	(27/2 ⁺)		B	
2354.4+x @	27/2 ⁺		B	
2499.4+x ^a	29/2 ⁻		B	
2541.2+x &	(29/2 ⁺)		B	
2631.4 [#] 9	33/2 ⁻		B	
2801.4+x ^a	(31/2 ⁻)		B	
2839.3+x &	(31/2 ⁺)		B	
3107.4+x ^a 6	(33/2 ⁻)		B	
3148.3+x &	(33/2 ⁺)		B	
3324.3 [#] 10	37/2 ⁻		B	
3381.5+x ^a	(35/2 ⁻)		B	
3468.3+x &	(35/2 ⁺)		B	
3640.4+x ^a	(37/2 ⁻)		B	
3797.9+x &	(37/2 ⁺)		B	
4029.7 [#] 10	(41/2 ⁻)		B	
4131.3+x &	(39/2 ⁺)		B	
4727.2 [#] 11	(45/2 ⁻)		B	

[†] From combined least-squares fit of levels and gammas in ^{173}W decay and (HI,xnγ).[‡] From γ-ray multiplicities, coincidence data, and complete analysis of rotational structure in (HI,xnγ), except where noted.

Adopted Levels, Gammas (continued) ^{173}Ta Levels (continued)

- # Band(A): 1/2(541) band; $\alpha=13.0$, $a=4.8$ (J=5/2, 9/2, 13/2, 17/2 levels).
- @ Band(B): 5/2(402) band; $\alpha=15.9$, $\beta=-23.6$ (J=5/2, 7/2, 9/2, 11/2 levels). $x<10$ keV ([1991KuZN](#)).
- & Band(C): 7/2(404) band; $\alpha=14.8$, $\beta=-21.4$ (J=7/2, 9/2, 11/2, 13/2 levels). $x<10$ keV ([1991KuZN](#)).
- ^a Band(D): 9/2(514) band; $\alpha=12.8$, $\beta=-2.1$ (J=9/2, 11/2, 13/2, 15/2 levels). $x<10$ keV ([1991KuZN](#)).
- ^b Band(E): 7/2(523) band. $x<10$ keV ([1991KuZN](#)).
- ^c Band(F): 3/2(532) band.
- ^d 5/2⁺ 5/2[402] for ≤ 10 level, 7/2⁺ 7/2[404] for ≤ 140.2 level, and 9/2⁻ 9/2[514] for ≤ 175.9 level from hindrance factors=0.2 (35.7 γ), =0.01 (130.19 γ), and <3.7 (166.1 γ) (pairing effects included) ([1991KuZN](#)).
- ^e 9/2⁻ 3/2[532] from level spacings for band feedings to 1/2[541] band ([1977An04](#)).

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Ta})$									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [†]	$\delta^\dagger$	α^a	Comments
0.0+x	5/2 ⁺	(≤10)		0.0	5/2 ⁻				
83.43	9/2 ⁻	83.46 [#] 4	100	0.0	5/2 ⁻	E2		7.81	
109.52+x	7/2 ⁺	109.55 5	100	0.0+x	5/2 ⁺	M1+E2	0.35 5	3.36	
130.19+x	7/2 ⁺	130.19 5	100 [#]	0.0+x	5/2 ⁺	M1 [@]		2.11	
165.88+x	9/2 ⁻	35.66 [#] 4	100 [#] 4	130.19+x	7/2 ⁺	E1+M2 [@]	0.041 [@] 12	3.1 13	B(E1)(W.u.)=3.9×10 ⁻⁶ 21; B(M2)(W.u.)=24 19
		166.08 5	18.6 [#] 7	0.0+x	5/2 ⁺	(M2) [@]		6.35	B(M2)(W.u.)=1.2 3
245.86+x	9/2 ⁺	136.32 5	100 4	109.52+x	7/2 ⁺	M1+E2	0.25 5	1.81	
		245.82 5	18.1 10	0.0+x	5/2 ⁺	(E2)		0.153	
260.37+x	(9/2 ⁺)	130.24 5	100	130.19+x	7/2 ⁺				
269.94	13/2 ⁻	186.51 5	100	83.43	9/2 ⁻	E2		0.381	
305.85+x	11/2 ⁻	139.96 5	100	165.88+x	9/2 ⁻	M1+E2	0.35 5	1.65	
324.54	7/2 ⁻	241.17 [@] 5		83.43	9/2 ⁻				
		324.49 [@] 5		0.0	5/2 ⁻	M1 [@]		0.168	
408.27+x	11/2 ⁺	162.38 5	100 4	245.86+x	9/2 ⁺	M1+E2	0.25 5	1.10	
		298.86 5	91 5	109.52+x	7/2 ⁺	E2		0.0836	
414.50+x	(11/2 ⁺)	154.10 5	100 5	260.37+x	(9/2 ⁺)	M1+E2	0.66 10	1.13 4	
		284.24 5	95 5	130.19+x	7/2 ⁺	(E2)		0.0974	
471.83+x	13/2 ⁻	165.90 5	100 4	305.85+x	11/2 ⁻	M1+E2	0.35 5	1.008	
		305.96 ^b 5	22.2 12	165.88+x	9/2 ⁻	(E2)		0.0780	
560.7	17/2 ⁻	290.8 2	100	269.94	13/2 ⁻	E2		0.0908	
590.22+x	(13/2 ⁺)	175.68 5	57.8 24	414.50+x	(11/2 ⁺)	(M1+E2)		0.69 ^{&} 22	
		330.01 5	100 5	260.37+x	(9/2 ⁺)	E2		0.0624	
593.40+x	13/2 ⁺	185.11 5	100 5	408.27+x	11/2 ⁺	(M1+E2)		0.59 ^{&} 20	
		347.24 5	47.5 25	245.86+x	9/2 ⁺	E2		0.0538	
623.54+x	7/2 ⁻	457.68 [@] 5	100 [@]	165.88+x	9/2 ⁻	M1 [@]		0.0675	
		493.38 [@] 5		130.19+x	7/2 ⁺				
		623.48 [@] 5	24.2 [@] 15	0.0+x	5/2 ⁺				
634?	(9/2 ⁻)	364 ^c 1	100	269.94	13/2 ⁻				
661.34+x	15/2 ⁻	189.45 5	100 4	471.83+x	13/2 ⁻	M1+E2	0.20 5	0.718	
		355.56 ^b 5	49 3	305.85+x	11/2 ⁻	E2		0.0503	
785.55+x	(15/2 ⁺)	195.40 5	26.6 12	590.22+x	(13/2 ⁺)	M1+E2	0.30 10	0.643 19	
		370.99 5	100 7	414.50+x	(11/2 ⁺)	E2		0.0446	
801.28+x	15/2 ⁺	207.76 5	97 6	593.40+x	13/2 ⁺	M1+E2	0.20 5	0.555	
		393.17 5	100 6	408.27+x	11/2 ⁺	E2		0.0380	
874.2+x	17/2 ⁻	213.0 2	100	661.34+x	15/2 ⁻	(M1+E2)	0.25 5	0.512	
		402.3 2	60	471.83+x	13/2 ⁻	E2		0.0357	
877?	(11/2 ⁻)	607 ^c 1	100	269.94	13/2 ⁻				
887.1	(15/2 ⁻)	617.2 2	100	269.94	13/2 ⁻				

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Ta})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [†]	$\delta^\dagger$	α^a
950.7	21/2 ⁻	390.0 2	100	560.7	17/2 ⁻	E2		0.0389
997.6+x	(17/2 ⁺)	212.7 2	23	785.55+x	(15/2 ⁺)	(M1+E2)		0.39& 14
		407.2 2	100	590.22+x	(13/2 ⁺)	E2		0.0346
1026.2+x	17/2 ⁺	225.0 2	73	801.28+x	15/2 ⁺	M1+E2	0.05 10	0.454
		432.6 2	100	593.40+x	13/2 ⁺	E2		0.0294
1105.2+x	19/2 ⁻	231.1 2	100	874.2+x	17/2 ⁻	M1+E2	0.25 5	0.409
		443.8 2	68	661.34+x	15/2 ⁻	E2		0.0275
1224.7+x	(19/2 ⁺)	227.1 2	17	997.6+x	(17/2 ⁺)	M1+E2	0.25 20	0.43 3
		438.8 3	100	785.55+x	(15/2 ⁺)	E2		0.0283
1271.0+x	19/2 ⁺	244.9 2	55	1026.2+x	17/2 ⁺	(M1+E2)	0.15 10	0.356
		469.7 2	100	801.28+x	15/2 ⁺	E2		0.0237
1294?	(19/2 ⁻)	407 ^c 1		887.1	(15/2 ⁻)			
		733 ^c 1		560.7	17/2 ⁻			
1304?	(15/2 ⁻)	743 ^c 1	100	560.7	17/2 ⁻			
1357.9+x	21/2 ⁻	252.6 2	100	1105.2+x	19/2 ⁻	(M1+E2)	0.15 5	0.327
		483.6 2	85	874.2+x	17/2 ⁻	E2		0.0220
1431.8	25/2 ⁻	481.1 2	100	950.7	21/2 ⁻	E2		0.0223
1464.8+x	(21/2 ⁺)	240.0 2	10.2	1224.7+x	(19/2 ⁺)	M1+E2	0.35 10	0.357 13
		467.2 2	100	997.6+x	(17/2 ⁺)	E2		0.0241
1526.8+x	21/2 ⁺	255.9 2	39	1271.0+x	19/2 ⁺	M1+E2	0.12 7	0.317
		500.5 2	100	1026.2+x	17/2 ⁺	E2		0.0203
1621.9+x	23/2 ⁻	264.0 2	87	1357.9+x	21/2 ⁻	M1+E2	0.15 5	0.289
		516.3 4	100	1105.2+x	19/2 ⁻	E2		0.0188
1713.5+x	(21/2 ⁻)	355.56 ^b 5		1357.9+x	21/2 ⁻	E2		0.0503
		608.6 2		1105.2+x	19/2 ⁻			
		840 1		874.2+x	17/2 ⁻			
1716.9+x	(23/2 ⁺)	251.6 6	<6.6	1464.8+x	(21/2 ⁺)	(M1+E2)		0.24& 10
		492.3 2	100	1224.7+x	(19/2 ⁺)	E2		0.0211
1800.9+x	23/2 ⁺	274.0 4	27	1526.8+x	21/2 ⁺	(M1+E2)	0.15 5	0.262
		530.0 6	100	1271.0+x	19/2 ⁺	E2		0.0176
1824?	(23/2 ⁻)	873 ^c 1	100	950.7	21/2 ⁻			
1875?	(21/2 ⁻)	924 ^c 1	100	950.7	21/2 ⁻			
1906.0+x	25/2 ⁻	284.1 2	99	1621.9+x	23/2 ⁻	(M1+E2)		0.17& 7
		548.1 2	100	1357.9+x	21/2 ⁻	E2		0.0162
1980.7+x	(25/2 ⁺)	515.9 2	100	1464.8+x	(21/2 ⁺)	E2		0.0188
1995.2	29/2 ⁻	563.4 2	100	1431.8	25/2 ⁻	E2		0.0152
2068.3+x	25/2 ⁺	267.3 4	<12.8	1800.9+x	23/2 ⁺	(M1+E2)		0.20& 8
		542.0 9	100	1526.8+x	21/2 ⁺	E2		0.0167
2194.1+x	27/2 ⁻	288.3 3	100	1906.0+x	25/2 ⁻	(M1+E2)		0.16& 7
		572.2 2	98	1621.9+x	23/2 ⁻	E2		0.0146

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Ta})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [†]	$\delta^\dagger$	α^a
2255.3+x	(27/2 ⁺)	538.4 2	100	1716.9+x	(23/2 ⁺)	E2		0.0169
2354.4+x	27/2 ⁺	286.1 2	<29	2068.3+x	25/2 ⁺	(M1+E2)		0.17& 7
		553.5 2	100	1800.9+x	23/2 ⁺	E2		0.0158
2499.4+x	29/2 ⁻	302.0 ^b 2	<184	2194.1+x	27/2 ⁻	(M1+E2)		0.14& 6
		593.5 2	100	1906.0+x	25/2 ⁻	E2		0.0134
2541.2+x	(29/2 ⁺)	560.5 2	100	1980.7+x	(25/2 ⁺)	E2		0.0154
2631.4	33/2 ⁻	636.2 2	100	1995.2	29/2 ⁻	E2		0.0114
2801.4+x	(31/2 ⁻)	302.0 ^b 2		2499.4+x	29/2 ⁻	M1+E2	0.15 5	0.201
		607.9 ^b 2		2194.1+x	27/2 ⁻	(E2)		0.0127
2839.3+x	(31/2 ⁺)	584.0 2	100	2255.3+x	(27/2 ⁺)	E2		0.0139
3107.4+x	(33/2 ⁻)	305.96 ^b 5		2801.4+x	(31/2 ⁻)	(M1+E2)		0.14& 6
		607.9 ^b 2		2499.4+x	29/2 ⁻	(E2)		0.0127
3148.3+x	(33/2 ⁺)	607.1 2	100	2541.2+x	(29/2 ⁺)	(E2)		0.0127
3324.3	37/2 ⁻	692.9 2	100	2631.4	33/2 ⁻	E2		0.00941
3381.5+x	(35/2 ⁻)	274.1 2	60	3107.4+x	(33/2 ⁻)	(M1+E2)	0.15 5	0.261
		580.6 2	100	2801.4+x	(31/2 ⁻)	(E2)		0.0141
3468.3+x	(35/2 ⁺)	629.0 2	100	2839.3+x	(31/2 ⁺)	(E2)		0.0117
3640.4+x	(37/2 ⁻)	259.3 2	58	3381.5+x	(35/2 ⁻)	(M1+E2)		0.22& 9
		532.5 2	100	3107.4+x	(33/2 ⁻)	(E2)		0.0174
3797.9+x	(37/2 ⁺)	649.6 2	100	3148.3+x	(33/2 ⁺)	(E2)		0.0109
4029.7	(41/2 ⁻)	705.3 2	100	3324.3	37/2 ⁻	(E2)		0.00904
4131.3+x	(39/2 ⁺)	663.0 2	100	3468.3+x	(35/2 ⁺)	(E2)		0.0104
4727.2	(45/2 ⁻)	697.5 2	100	4029.7	(41/2 ⁻)	(E2)		0.00927

[†] From (HI,xny) except where noted.

[‡] Relative photon branching from each level; values are from (HI,xny) except where noted. Upper limits are given for photon branchings affected by multiple placement.

Weighted average from ¹⁷³W ϵ decay and (HI,xny).

@ From ¹⁷³W ϵ decay.

& Brackets combined range for M1 and E2.

^a Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

^b Multiply placed.

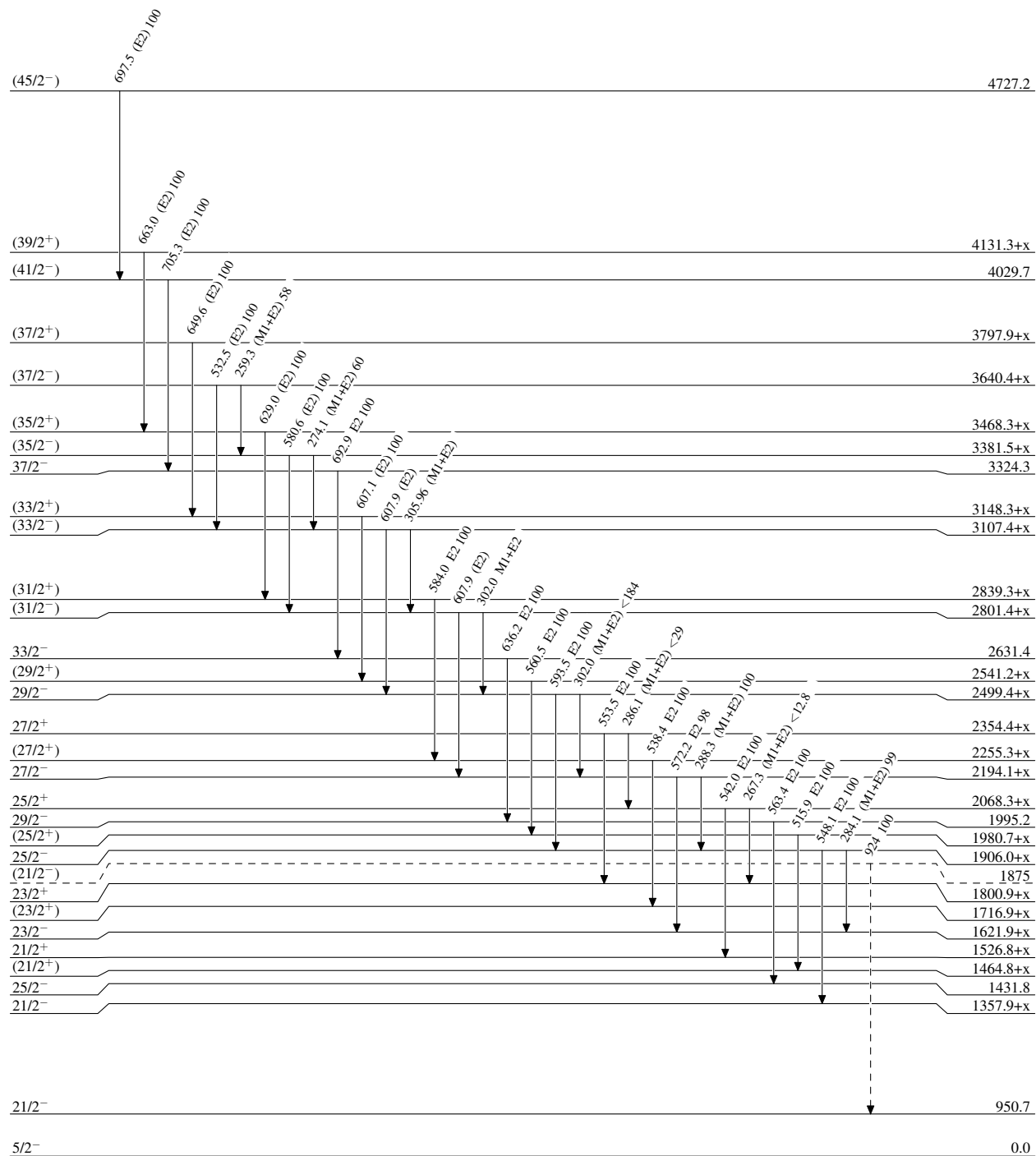
^c Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

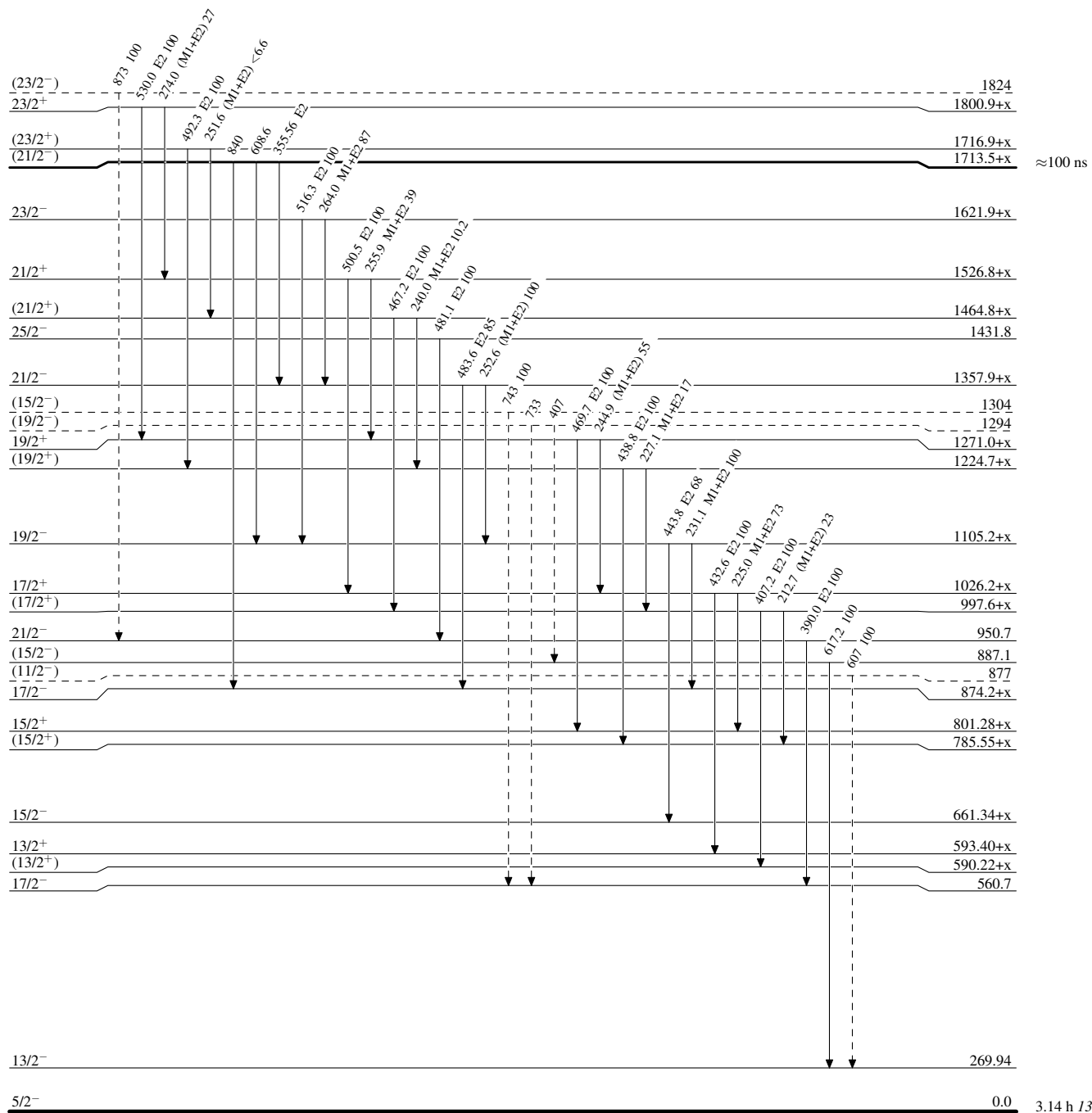
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

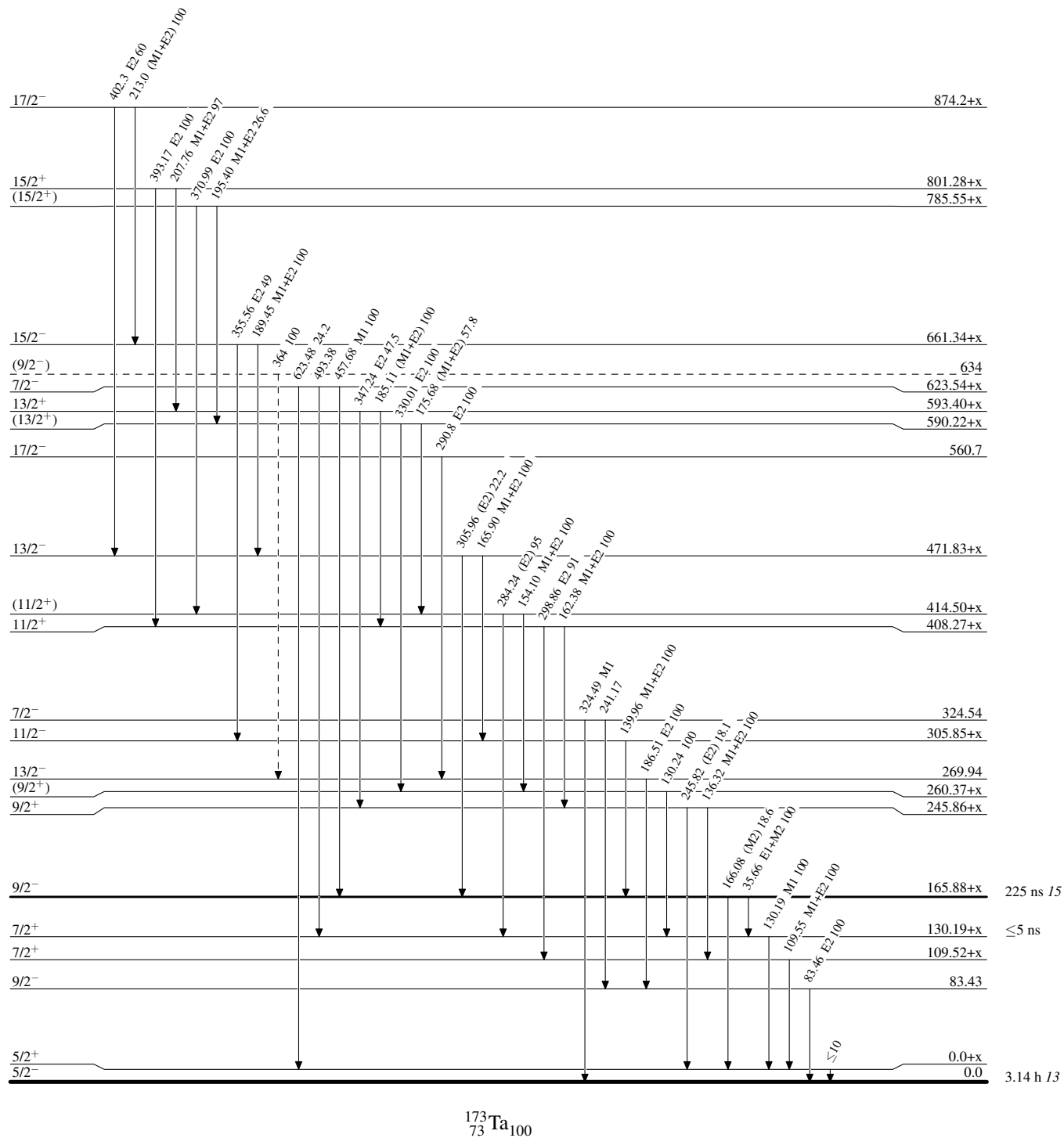
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

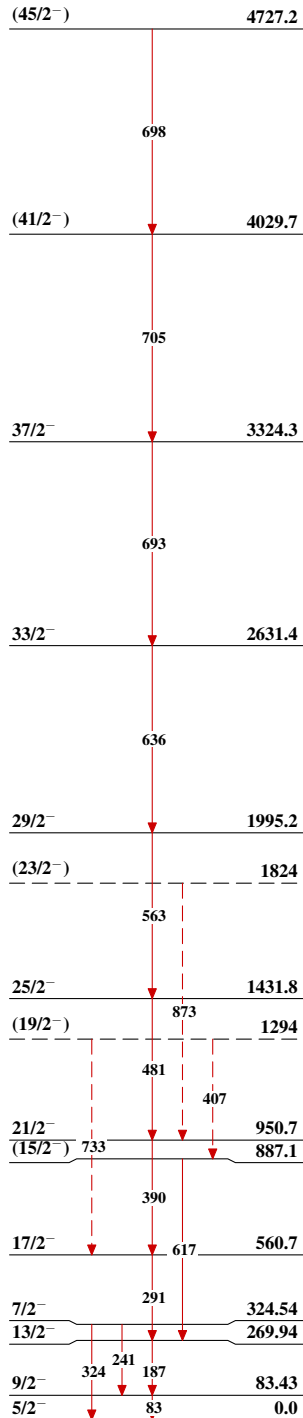
Level Scheme (continued)

Intensities: Relative photon branching from each level

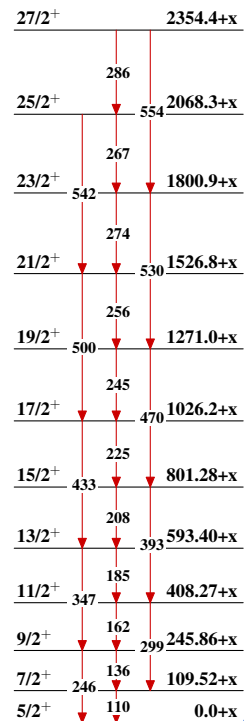
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

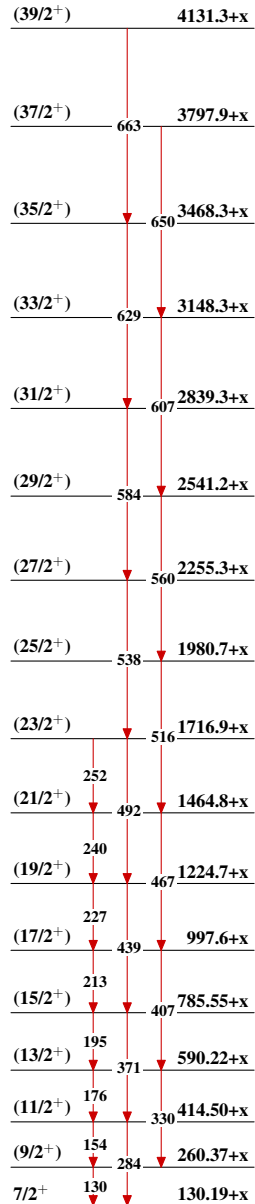
Band(A): 1/2(541) band; $\alpha=13.0$,
 $a=4.8$ ($J=5/2, 9/2, 13/2, 17/2$
 levels)



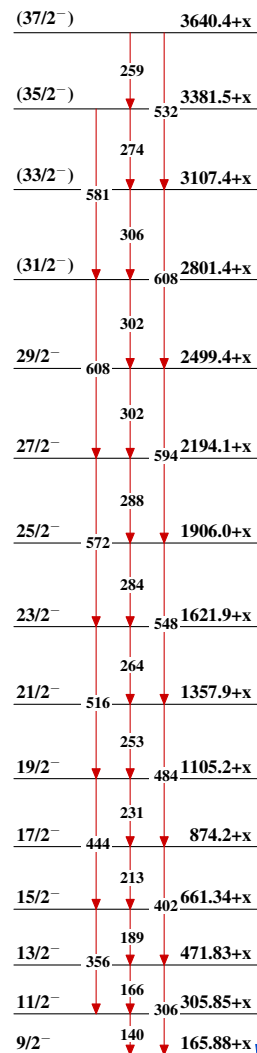
Band(B): 5/2(402) band; $\alpha=15.9$,
 $\beta=-23.6$ ($J=5/2, 7/2, 9/2, 11/2$
 levels)



Band(C): 7/2(404) band; $\alpha=14.8$,
 $\beta=-21.4$ ($J=7/2, 9/2, 11/2, 13/2$
 levels)



Band(D): 9/2(514) band; $\alpha=12.8$,
 $\beta=-2.1$ ($J=9/2, 11/2, 13/2, 15/2$
 levels)



Band(E): 7/2(523) band

7/2⁻ 623.54+x

Adopted Levels, Gammas (continued)

Band(F): 3/2(532) band

(21/2⁻) 1875

(15/2⁻) 1304

(11/2⁻) 877

(9/2⁻) 634

¹⁷³Ta₇₃⁻¹¹